

DATA SHEET

PEMD13; PUMD13
NPN/PNP resistor-equipped
transistors; $R1 = 4.7\text{ k}\Omega$, $R2 = 47\text{ k}\Omega$

Product data sheet
Supersedes data of 2001 Feb 27

2003 Oct 08



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FEATURES

- Built-in bias resistors
- Simplified circuit design
- Reduction of component count
- Reduced pick and place costs.

APPLICATIONS

- Low current peripheral driver
- Replacement of general purpose transistors in digital applications
- Control of IC inputs.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	TYP.	MAX.	UNIT
V _{CEO}	collector-emitter voltage	–	50	V
I _O	output current (DC)	–	100	mA
TR1	NPN	–	–	–
TR2	PNP	–	–	–
R1	bias resistor	4.7	–	kΩ
R2	bias resistor	47	–	kΩ

DESCRIPTION

NPN/PNP resistor-equipped transistors (see “Simplified outline, symbol and pinning” for package details).

PRODUCT OVERVIEW

TYPE NUMBER	PACKAGE		MARKING CODE	PNP/PNP COMPLEMENT	NPN/PNP COMPLEMENT
	PHILIPS	EIAJ			
PEMD13	SOT666		Z1	PEMB13	PEMH13
PUMD13	SOT363	SC-88	3*1 ⁽¹⁾	PUMB13	PUMH13

Note

- * = p: Made in Hong Kong.
* = t: Made in Malaysia.
* = W: Made in China.

SIMPLIFIED OUTLINE, SYMBOL AND PINNING

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
PEMD13 PUMD13	Top view MAM468	1 2 3 4 5 6	emitter TR1 base TR1 collector TR2 emitter TR2 base TR2 collector TR1

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ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PEMD13	–	plastic surface mounted package; 6 leads	SOT666
PUMD13	–	plastic surface mounted package; 6 leads	SOT363

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per transistor; for the PNP transistor with negative polarity					
V _{CBO}	collector-base voltage	open emitter	–	50	V
V _{CEO}	collector-emitter voltage	open base	–	50	V
V _{EBO}	emitter-base voltage	open collector	–	10	V
V _I	input voltage TR1		–	+30	V
	positive			–5	V
V _I	input voltage TR2		–	+5	V
	positive			–30	V
I _O	output current (DC)		–	100	mA
I _{CM}	peak collector current		–	100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	–	200	mW
	SOT363	note 1		200	mW
	SOT666	notes 1 and 2	–	200	mW
T _{stg}	storage temperature		–65	+150	°C
T _j	junction temperature		–	150	°C
T _{amb}	operating ambient temperature		–65	+150	°C
Per device					
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	–	300	mW
	SOT363	note 1		300	mW
	SOT666	notes 1 and 2	–	300	mW

Notes

- Device mounted on an FR4 printed-circuit board, single-sided copper, standard footprint.
- Reflow soldering is the only recommended soldering method.

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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
Per transistor				
R _{th j-a}	thermal resistance from junction to ambient	T _{amb} ≤ 25 °C		
	SOT363	note 1	625	K/W
	SOT666	notes 1 and 2	625	K/W
Per device				
R _{th j-a}	thermal resistance from junction to ambient	T _{amb} ≤ 25 °C		
	SOT363	note 1	416	K/W
	SOT666	notes 1 and 2	416	K/W

Notes

1. Device mounted on an FR4 printed-circuit board, single-sided copper, standard footprint.
2. Reflow soldering is the only recommended soldering method.

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per transistor; for the PNP transistor with negative polarity						
I _{CBO}	collector-base cut-off current	V _{CB} = 50 V; I _E = 0	–	–	100	nA
I _{CEO}	collector-emitter cut-off current	V _{CE} = 30 V; I _B = 0	–	–	1	μA
		V _{CE} = 30 V; I _B = 0; T _j = 150 °C	–	–	50	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 V; I _C = 0	–	–	170	μA
h _{FE}	DC current gain	V _{CE} = 5 V; I _C = 10 mA	100	–	–	
V _{CEsat}	collector-emitter saturation voltage	I _C = 5 mA; I _B = 0.25 mA	–	–	100	mV
V _{i(off)}	input-off voltage	I _C = 100 μA; V _{CE} = 5 V	–	0.6	0.5	V
V _{i(on)}	input-on voltage	I _C = 5 mA; V _{CE} = 0.3 V	1.3	0.9	–	V
R1	input resistor		3.3	4.7	6.1	k Ω
$\frac{R2}{R1}$	resistor ratio		8	10	12	
C _c	collector capacitance	I _E = i _e = 0; V _{CB} = 10 V; f = 1 MHz				
	TR1 (NPN)		–	–	2.5	pF
	TR2 (PNP)		–	–	3	pF

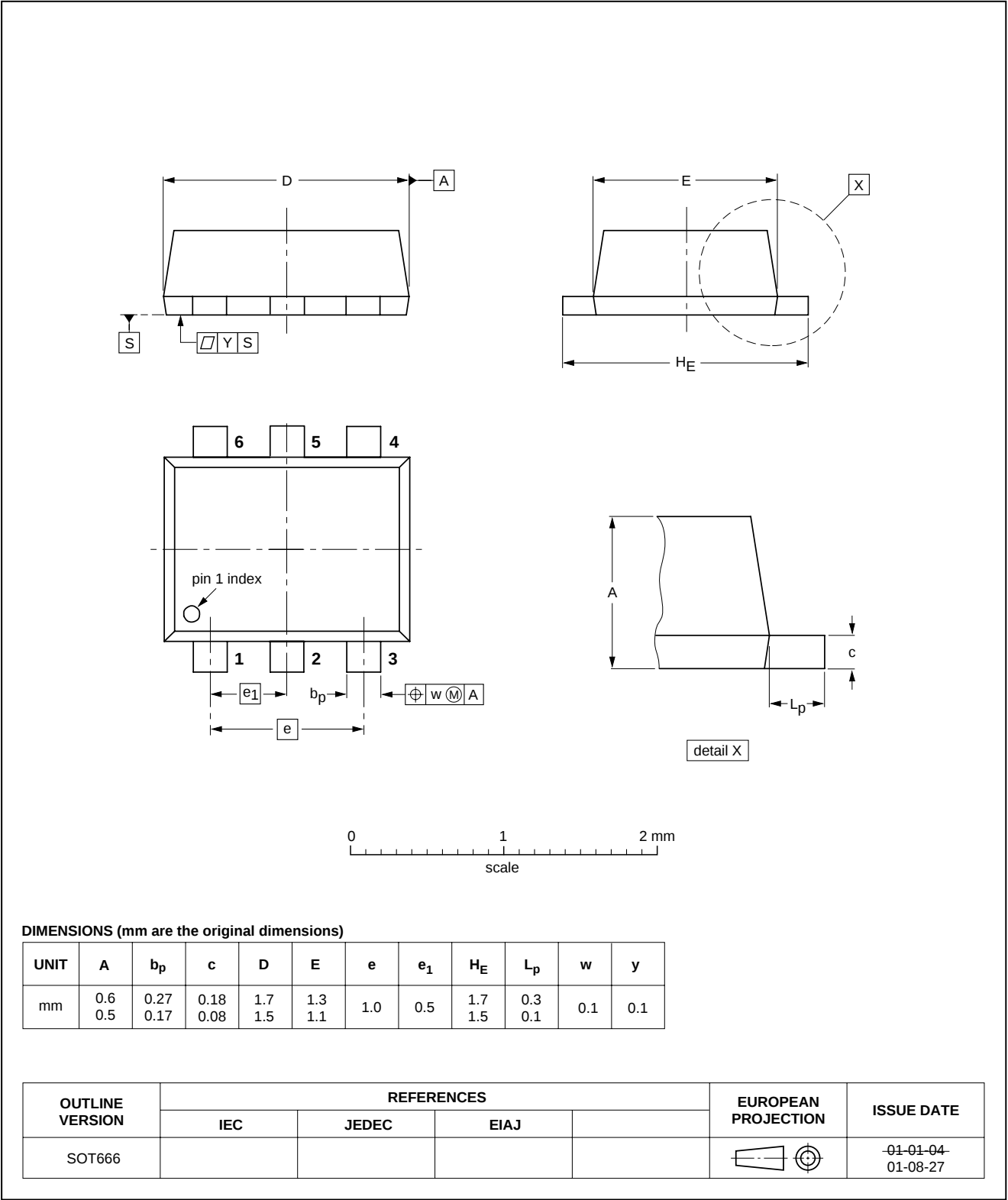
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PACKAGE OUTLINES

Plastic surface mounted package; 6 leads

SOT666

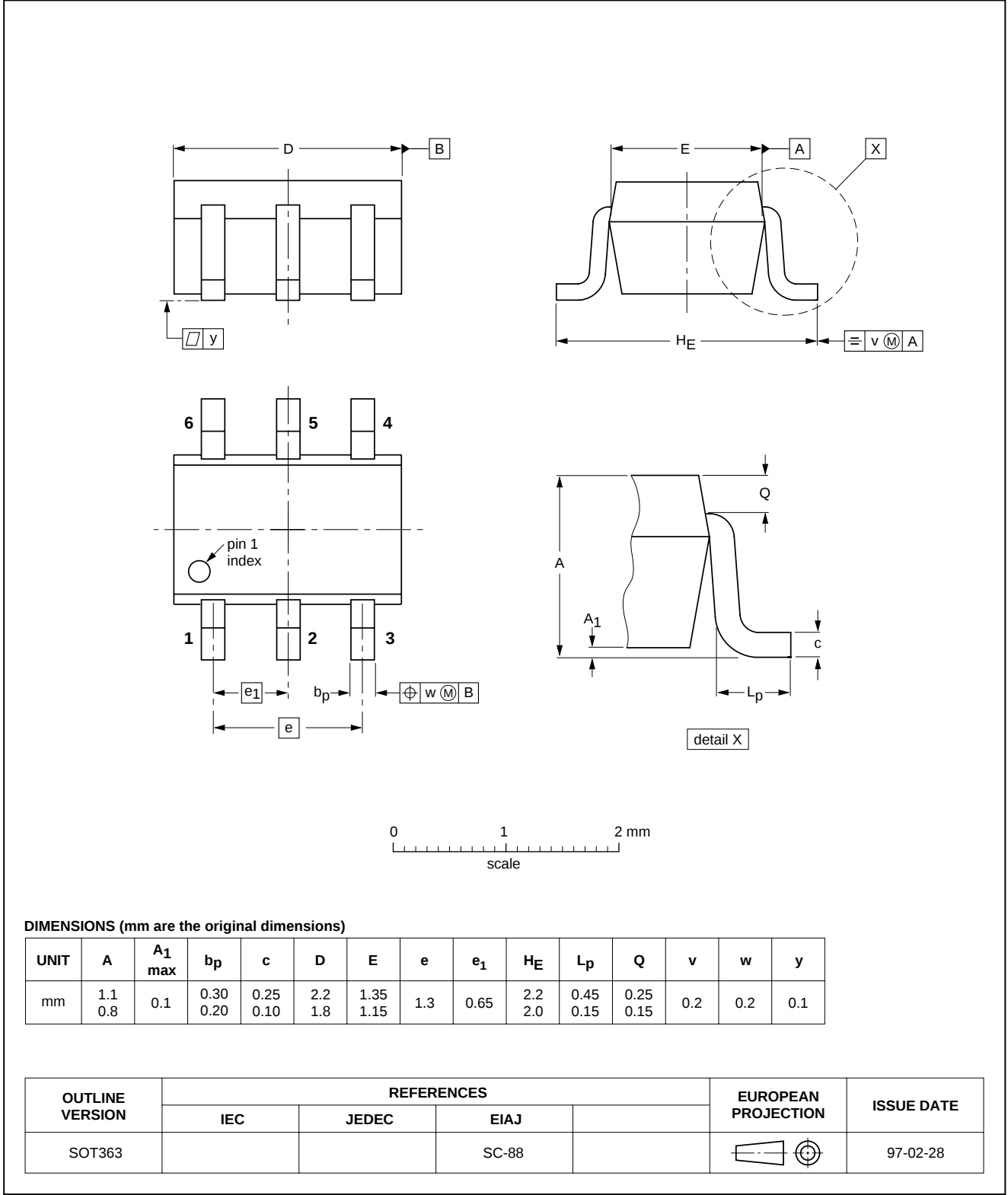


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DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

Notes

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